

QQ-L-201f

November 29, 1965

SUPERSEDING

Int. Fed. Spec. QQ-L-00201e (Navy-Ships)

December 10, 1962 and

Fed. Spec. QQ-L-201d

April 6, 1961

## FEDERAL SPECIFICATION

### LEAD SHEET

*This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.*

#### 1. SCOPE AND CLASSIFICATION

**1.1 Scope.** This specification covers lead sheet used for chemical and structural purposes.

##### 1.2 Classification.

**1.2.1 Grades.** Lead sheet shall be furnished in the following grades, as specified (see 6.2):

Grade B.

Grade C.

Grade D.

#### 2. APPLICABLE SPECIFICATIONS AND STANDARDS

**2.1** The following specifications and standards, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

##### *Federal Standards:*

Fed. Std. No. 102—Preservation, Packaging, and Packing Levels.

Fed. Std. No. 123—Marking for Domestic Shipment (Civilian Agencies).

Fed. Test Method Std. No. 151—Metals; Test Methods.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S.

Government Printing Office, Washington, D. C. 20402.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D. C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, and Seattle, Wash.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

##### *Military Specifications:*

MIL-N-3944—Non-Ferrous Products (Other Than Aluminum, Magnesium, Copper, or Their Alloys) Packaging of.

MIL-C-3993—Copper and Copper-Base Alloy Mill Products, Packaging of.

##### *Military Standard:*

MIL-STD-129—Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

#### 3. REQUIREMENTS

**3.1 Material.** The raw materials used shall be such as to produce lead sheet meeting the requirements of this specification. For grade B, reclaimed lead obtained by recovery of metallic lead and its alloys by

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the simple reclaiming process of melting, drossing, and casting is acceptable under this specification if chemical composition requirements are within the limits specified herein. Grades C and D lead shall be either primary or secondary lead produced from ore or other materials by a conventional process of reduction and refining or other processes which equally preclude the presence of unusual deleterious elements. Reclaimed lead is not acceptable for grades C and D.

**3.1.1** Grades C and D lead sheet shall be reduced by rolling from an original casting not less than twice the thickness of the finished sheet.

### 3.2 Chemical composition.

**3.2.1** Lead sheet shall conform to the chemical composition requirements shown in table I.

TABLE I—Chemical composition

<sup>4</sup> Element	Grade B percent maximum	Grade C percent maximum	Grade D percent maximum
Lead .....	199.50	199.90	199.85
Antimony, tin and arsenic (total) ..	—	0.002	0.002
Iron .....	—	.002	.002
Bismuth .....	( <sup>2</sup> )	.025	.025
Zinc .....	—	.001	.001
		<sup>3</sup> .040 to <sup>3</sup>	<sup>3</sup> .040 to
Copper .....	—	.080	.080
Silver .....	—	.02	.020
Tellurium .....	—	—	<sup>3</sup> .035 to .060

<sup>1</sup> Minimum by difference.

<sup>2</sup> When specified (see 6.2), the bismuth content of grade B shall be 0.025 percent maximum.

<sup>3</sup> Range.

<sup>4</sup> For grades C and D, no element other than those specified shall exceed 0.001 percent maximum as determined by a normal spectrographic analysis.

**3.2.2** The contractor shall furnish an analysis of each melt showing the percentage of each of the elements specified in 3.2.1.

**3.3 Hardness.** Grade D lead sheet shall have an "as rolled" hardness of 40 to 68 as read on the Rockwell "R" scale (1/2 inch

ball, 60-kilogram (kg.) load, 10 seconds), or a Brinell hardness of 6.0 to 7.5 measured with a 10 mm. ball and a 100 kg. load for a duration of 30 seconds. These hardness values shall be obtained within a 24 hour period after the final rolling of the sheet.

### 3.4 Dimensions.

**3.4.1 Thickness.** Lead sheet in ordered weights up to and including 3-1/2 pounds per square foot shall not vary in thickness by more than plus 0.008, minus 0.005 from the thickness calculated from the ordered weight per square foot (see 6.2). For the purpose of calculation, it shall be assumed that a piece of lead sheet one-foot square and one-inch thick weighs 59.04 pounds.

**3.4.2 Weight.** Lead sheet in ordered weights over 3-1/2 pounds per square foot shall not vary in weight by more than plus or minus 5 percent of the ordered weight per square foot (see 6.2).

**3.4.2.1 Alternate.** When specified (see 6.2), lead sheet in ordered weights over 3-1/2 pounds per square foot shall not vary in thickness by more than plus 1/32 inch and minus 0 inch.

**3.4.3 Width and length.** Lead sheet in rolls (see 3.5) shall not vary from the ordered width by more than plus or minus 1/4 inch and the ordered length by more than plus or minus 1/2 inch. Unless otherwise specified, grades C and D lead sheet in flat lengths shall not vary from the ordered width and length by more than plus or minus 1/4 inch (see 6.2).

**3.5 Form.** Unless otherwise specified in the contract or order, lead sheet shall be furnished in rolls. When specified (see 6.2), flat lengths shall be furnished.

**3.6 Identification marking.** Lead sheet (grades C and D only) 1/2-inch thick and over shall be marked along one edge using constantly recurring symbols with a non-water soluble ink or paint. These symbols shall include the Federal specification symbol, grade, the manufacturer's name, brand,

or trademark and the melt or cast number. The symbols shall be repeated at intervals not greater than 3 feet along the edge of the sheet. For lead sheet less than 1/2 inch thick, this information shall be furnished on the packing container (see 5.3).

**3.7 Workmanship.** The lead sheet shall be free from injurious pits, dents, buckles, waves, scratches, grit, foreign matter, porosity, and other defects affecting the serviceability of the material.

#### 4. QUALITY ASSURANCE PROVISIONS

**4.1 Responsibility for inspection.** Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

##### 4.2 Inspection lot.

**4.2.1** For inspection purposes, a lot shall consist of all lead sheet of the same grade and thickness produced by one manufacturer and offered for delivery at one time for inspection, but shall not exceed 5,000 pounds.

**4.2.2** A lot for grade D lead sheet shall be further limited to the sheet having the same total material reduction and heat treating cycles (as necessary), from the same manufacturing or smelting heat. For this case, a lot that cannot be identified by heat shall be cause for rejection.

**4.2.3** For grades C and D or when specified grade B (see 6.2), a lot for chemical analysis shall also be limited to the lead sheet produced by one manufacturing or smelting heat. For this case, a lot that cannot

be identified by heat shall be cause for rejection.

##### 4.3 Sampling for quality conformance inspection.

**4.3.1 Sampling for chemical analysis.** Two samples for chemical analysis shall be selected from each lot. Each sample shall be taken from a different sheet or trimmings from different sheets, and shall consist of not less than 600 grams (g.) of fine, clean clippings, drillings, millings, or sawings which shall be free from oil, iron, dirt, grit, or other foreign matter. The samples shall be separately packed, labeled, and forwarded to the laboratory for analysis. When a spectrographic analysis is to be made, the quantity and form of the samples shall be satisfactory for use by the laboratory at which the analysis is to be performed.

**4.3.2 Sampling for hardness tests.** Two samples shall be selected from each lot of lead sheet for the hardness test (see 4.5.2).

**4.4 Visual and dimensional examination.** All material in the lot shall be visually examined to verify compliance with the requirements of this specification regarding dimensions (see 3.4), marking (see 3.6), and workmanship (see 3.7), and other requirements not including tests. Sufficient number of readings shall be taken over each sheet to insure that dimensional tolerances of 3.4 are maintained.

##### 4.5 Test procedures.

**4.5.1 Chemical analysis.** Chemical analysis shall be made on each sample selected in accordance with 4.3.1, by wet chemical or spectrographic methods 111 or 112 of Fed. Test Method Std. No. 151 to determine conformance with 3.2. In case of dispute, chemical analysis by wet chemical methods shall be basis for acceptance of chemical composition, and spectrographic analysis, the basis for acceptance of other impurity elements as specified in table I, note 4.

**4.5.2 Hardness test.** Each of the samples selected in accordance with 4.3.2 shall be

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tested in accordance with Fed. Test Method Std. No. 151, method 242 or 243, except as modified herein, to determine conformance with 3.3. The Rockwell hardness shall be taken with a 1/2-inch steel ball on a Rockwell standard or Rockwell superficial machine. The machine shall have a suspended load of 60 kg. The major load shall be applied for 10 seconds (after tripping), regardless of the apparent stopping of the scale pointer. With the Rockwell standard machine, the readings shall be taken from the red scale. Readings with either Rockwell or Brinell shall be taken on both sides of each sample. The first reading taken on each side shall be disregarded. The minimum thickness of the specimen to be tested shall be ten times the depth of the impression. In accordance with 3.3, the type of hardness tester used is optional.

#### 4.6 Rejection and retests.

**4.6.1 Rejections.** If a test specimen fails to meet any of the requirements of this specification, it shall be cause for rejection of the lot represented by the specimen. If any lead sheet fails to meet the visual or dimensional examination (see 4.4), the sheet shall be cause for rejection.

**4.6.2 Retests.** Retests shall be permitted in accordance with the provisions of Fed. Test Method Std. No. 151.

**4.6.2.1** If a hardness test made within the 24-hour limit fails to meet the range specified in 3.3, a retest shall be permitted if completed prior to 24 hours after rolling. If the manufacturer fails to perform the hardness test within the 24-hour time limit, the hardness test may be performed 3 additional times with 5-day increments between tests. The results of the tests, if performed, shall be forwarded to the Government for evaluation and determination of material acceptability.

**4.7 Inspection of preparation for delivery.** The preservation, packaging, packing, and marking shall be examined for con-

formance with the requirements of section 5.

### 5. PREPARATION FOR DELIVERY

(For civil agency procurement, the definitions and application of the levels of packaging and packing shall be in accordance with Fed. Std. No. 102.)

**5.1 Packaging.** Material shall be furnished in rolls or flat sheets (see 3.5 and 6.2).

**5.2 Packing.** Packing shall be level A, B, or C as specified (see 6.2).

#### 5.2.1 Level A or B.

**5.2.1.1 Flat sheets.** Sheets of one grade, size, and thickness shall be packed level A or B (see 6.2), in accordance with the requirements of MIL-C-3993.

**5.2.1.2 Rolls.** Rolls of one grade, size, and thickness shall be packed level A or B (see 6.2), in accordance with the requirements of MIL-N-3944.

**5.2.2 Level C.** Material shall be packed in accordance with the supplier's commercial practice to assure receipt by carrier and safe delivery to the destination at the lowest transportation rate or rating. Containers shall conform to carrier regulations as applicable to the mode of transportation.

#### 5.3 Marking.

**5.3.1 Military agencies.** In addition to any special marking required herein or in the contract or order, shipments shall be marked in accordance with MIL-STD-129.

**5.3.2 Nonmilitary agencies.** In addition to any special marking contained herein or in the contract or order, shipments shall be marked in accordance with Fed. Std. No. 123.

### 6. NOTES

**6.1 Intended use.** Grade B lead sheet is intended for use in laboratories and shops

TABLE II. Approximate thickness of lead sheet specified and furnished by weight.

(Trade accepted figures: For information only.)  
(Basis: 1 cubic inch of lead weight 0.41 pound and 1 square foot of lead sheet 1 inch thick 59.04 pounds.)

Weights: pounds per square foot	Approximate thickness in inches		Weights: pounds per square foot	Approximate thickness in inches	
	Decimals	Fractions		Decimals	Fractions
3/4 .....	0.0117	1/80	8	0.1250	1/8
1 .....	.0156	1/64	10	.1563	5/32
1 1/2 .....	.0234	3/128	12	.1875	3/16
2 .....	.0312	1/32	14	.2188	7/32
2 1/2 .....	.0391	5/128	16	.2500	1/4
3 .....	.0468	3/64	20	.3333	1/3
3 1/2 .....	.0547	7/128	24	.4000	2/5
4 .....	.0625	1/16	30	.5000	1/2
5 .....	.0781	5/64	40	.6667	2/3
6 .....	.0937	3/32	60	1.0000	1

in general application. Grade C is intended for use where lead sheet of high purity is indicated, and for submarine battery tank liners. Grade D lead sheet is intended for use where lead sheet of high purity and structural strength is indicated.

**6.1.1 Grade B.** When grade B lead sheet is intended for use with corrosive chemicals, the bismuth content should be specified as 0.025 percent, maximum.

**6.2 Ordering data.** Purchasers should exercise any desired options offered herein and procurement documents should specify the following:

- Title, number, and date of this specification.
- Grades, size, thickness, or weight and quantity required (see 1.2 and 3.4).
- Alternate thickness tolerance when required (see 3.4.2).
- Form of lead sheet if other than rolls (see 3.5).
- Identification by heat when required (see 4.2.3).
- Applicable level of packaging, packing, and marking required (see section 5).
- Limit on bismuth in grade B when required (see<sup>2</sup> of table I).

**6.3 Lead sheet** is produced in various thicknesses, widths, and lengths. Ordinarily lead sheet up to 1 inch thickness is referred to the number of pounds per square foot, as given in table II. The standard dimensions for lead sheet, weighing 3 pounds per square foot or over, are 8 feet, 6 inches wide by 20 feet long. The standard dimensions for lead sheet weighing less than 3 pounds per square foot, are 4 to 5 feet wide by 15 feet long. Wider and longer lead sheets are available when specified. However, all lead sheet is usually ordered cut to size which will be used ultimately. Lead sheet thicker than 1 inch should be ordered to the desired thickness.

**6.4 Transportation description.** The transportation descriptions and minimum weights applicable to this commodity are:

**Rail:**

Lead sheet.

Carload minimum weight 40,000 pounds.

**Motor:**

Lead sheet.

Truckload minimum weight 40,000 pounds, subject to Rule 115, National Motor Freight Classification.

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**MILITARY CUSTODIANS:**

Army—MR

Navy—SH

Air Force 69

*Review activities:*

Army—MR, MO, MU

Navy—SH, WP, YD

*User activities:*

Army—EL

*Preparing activity:*

Navy—SH

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